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MSTA

Montana Science Teachers Association

Volume 5, No. 5 MARCH 1987

Meet Your Officers—Part II
The Regional MSTA Directors

News gathering, communication, assistance to other teachers, and representation at business meetings are some of the several roles of MSTA directors. North or south, east or west, there is a contact near you who likes to teach science.

Russ Hartford has taught at Flathead High in Kalispell for 22 years. Chemistry and geology are his specialties in the classroom. Hunting, fishing, handball and golf are his hobbies. Russ and colleague Gary Freebury have provided notable service to science teachers and school administrators with their science safety workshops conducted across the state during the last two years. His wife has given testimony to Russ's success as an educator by noting the fact that each of his three children has chosen science-related careers: nursing, respiratory therapy and biology teaching.

David Puyear, a native of Stevensville, Montana, teaches junior high science at Blue Sky Schools in Rudyard, Montana. His wife Barbara is also a teacher. Dave is very involved in teaching science from a "hands-on" approach, and puts much energy into "individual science projects" encouraging students to choose one area of science to study in-depth during each year. Watch for his students at the Science Fair!

Doug Schenkle of Helena High School is a native of Livingston, Montana, and taught in Baker before coming to Helena where he teaches chemistry. Doug is active in MEA, currently serving on the legislative committee. His wife Cathy is a research analyst for the Department of Labor. Other interests include his two children, hunting, fishing, woodworking, and general construction.

Linda Robinson of Billings has 17 years of teaching experience (grades 2, 4, 6) during which she emphasizes science. Now teaching at Arrowhead Elementary, Linda is conducting grade level science inservice meetings for School District No. 2, has organized regional MSTA meetings in Billings to encourage interest in promoting elementary science instruction, is vice president (for teaching math and science) of the Montana Academy of Science, and has conducted several workshops and presentations for teachers at state and regional conferences.

Steve Schumacher of Malta High School teaches physics, math and computer science. He's been in the classroom for 13 years, four of them at Hingham. An avid spelunker, he has explored both commercial and "wild caves" in the Little Rockies and in Alabama where he served two years in the army. Steve is president of the MEA for the Malta public schools, works with Cub and Boy Scouts, recently had the thrill of floating the Milk River at flood stage, and occasionally teaches a computer class for adults. A self-confessed "electronic nut," Steve has built his own personal computer.

Richard Menger came from New Jersey to accept a scholarship at the University of Montana's forestry school. He stayed to earn his master's degree and is currently teaching in Baker where he and his wife Jan and children live. Now in his 14th year at Baker High School, Rich teaches horticulture and three different levels of biology classes, coaches the golf team and works as a sanitarian for Fallon and Carter counties. The greenhouse that this enterprising teacher built with grant funds has provided Baker High with tulips and crocuses in February and is giving a head start to hundreds of marigolds and petunias for replenishing flower beds on the school grounds.

Great Falls Schools Recognized

The environmental sciences program at the Great Falls Public Schools has been recognized nationally as one of the ten science programs in the nation that "best fit" the National Science Teachers Association criteria for excellence in environmental education, according to State Superintendent of Public Instruction Ed Argenbright.

The program and Great Falls Public Schools' Curriculum Coordinator Janet Thomson will be recognized at the 35th National Convention of the science teachers association to be held in Washington, D.C. on March 26-29.

The program's curricular materials will be displayed at the conference and will be included in a video production about the honors program. Other programs honored are from Washington, Arizona, Rhode Island, Florida, California, New York, Pennsylvania, Ohio and Alaska.

In making the announcement, Superintendent Argenbright said, "I think it is most appropriate during a period when all of the news out of Helena seems to be bad that we spotlight one of the excellent programs that are being carried on every day in our Montana schools. I am delighted that this Montana project has been recognized nationally as an example of the best programs available in our schools."

NATIONAL PUBLICATIONS FEATURE

Montana Dinosaurs, Scientists

by Doris A. Simonis
University of Montana
Missoula, Montana 59812

Paleontologist **Jack Horner** and his assistant, **Bob Makela**, science teacher from Rudyard, Montana, have gained national attention in four recent articles. Teachers and students alike will find these stories, often richly illustrated by Montana artist Doug Henderson, engrossing examples of how scientists work and think.

Most recently, the cover of *Discover* (March 1987) shows "What Were Dinosaurs Really Like?" The editor's comments on "Limning Terrible Lizards," page 4; "Birth of a Heresy" by Virginia Morell, page 26; and "The Lesson of the Dinosaurs" by Steven Jay Gould, page 51, all provide intriguing insights on paleontology. The men, the methods, the fossils themselves and their effect on human thinking and imagination are stimulating subjects for science lovers of any age.

"Rewriting the History of the Dinosaurs" in *National Wildlife* (Dec./Jan. 1987) is another Henderson-embellished look at Jack Horner's work written by Virginia Morell. "Brushing Up on Dinosaurs" by Stefi Weisburd in *Science News* (October 4, 1986) emphasizes how science and art can be combined to give vivid glimpses into prehistoric life. The drawings, paintings and sculptures illustrating the article are part of a traveling exhibit on "Dinosaurs Past and Present" that is touring natural history museums in Denver, Philadelphia, Washington, D.C., New York City, Albuquerque, Drumheller (Alberta) and Toronto. Later these American illustrations and technocrafts may be sent to Japan and China for display.

Closer to home, Montanans can see some of Jack Horner's work in the Museum of the Rockies, Bozeman, Montana: at the Fort Missoula Historical Museum in Missoula (through March 31, 1987 only), and in *Maia: A Dinosaur Grows Up* by Horner, James Gorman and Doug Henderson, available at most book stores.

"Fossils are official" reported the Fall 1986 issue of *Earth Science* which described snails, mammoths, petrified wood, saber-toothed cats, and other prehistoric plants and animals chosen as state fossils. But there was no mention of Montana's dinosaurs, an oversight corrected in the Winter 1986 issue which features a half-page sketch of baby Maiasaurs and a letter from Montana. Larry G. Field of Billings informed the editors that Jack Horner's work in northcentral Montana was the impetus for the 1985 Montana House Bill 81 making **Maiasaura peeblesorum** the official state fossil.

The above-mentioned publications plus Bob Makela's transparencies and directions* for making your classroom a dinosaur hunting ground can be fertile materials for exciting units on the history, philosophy or methods of science; on adaptation and diversity of life; on the geological record of past life; on ratio and proportion (math), as a tool for reconstructing animal forms; or on accuracy, perspective, and informed imagination in art. Readers, you may have other ideas. Let us know how you make the interest in Montana dinosaurs work for you in the classroom.

*Author's Note: Bob Makela's original lesson packet is available for field-testing from Bob Makela, Blue Sky High, Rudyard, MT 59540.

Math Science Monies: Abuse and Creative Use

During the past weeks, I have talked with teachers around the state and directors of the Math/Science funding. Though monies are being used for many creative projects, discussions lead me to believe that some districts and individual teachers have no idea that these monies are available. In other cases, it is apparent that staff members have not been involved in the decision to spend district funds. The legislature is now in session, and we are all concerned about the level of funding for education. The suggested freeze on the Foundation Program, the impact of Initiative 105, the general state of the revenue picture for local and state governments all suggest that the next few years will be bleak with regards to education funding. At times like this, it is difficult to believe that some districts would either turn down funds to be used for staff development, or return funds because they could not find constructive uses for the money. In some other cases, we find that the money was spent for almost a year, then districts scrambled to find a way to "get rid of the funds" before the end of the fiscal year.

A few cases will serve as illustrations. One district passed up their allocation of $6,000, another received more than $14,000 only to return over $7,000 unused. A district which received $2,500 returned it saying that it could not find a way to use the money. Another district that had several thousand dollars left late in the year ran a lottery; put your name in the hat and win a trip to a conference. One was not required to be a math or science teacher but simply make a commitment to travel.

While these are some of the unfortunate stories, there are many more that indicate profitable use of these inservice dollars. One district brought in several nationally known speakers at various times to present inservice for all segments of the staff. Each day-long workshop was tailored to the needs of the teachers at that level. Another district beginning the process of revision of the math curriculum had a national leader spend the day with the curriculum committee. He presented new topics, reviewed the local curriculum with the staff, and offered alternatives. A small district which was very interested in upgrading the skills of a math teacher spent its entire allocation on expenses for that teacher to attend summer school. The teacher was renewed and the district made a valuable investment in the future. Several districts sent their entire science staff to the regional science safety workshops. In one region, five districts combined their small allocations and provided a workshop for math and science teachers. These are but a few of the quality programs provided by districts.

In conclusion, staff development is vital to the continued quality of the mathematics curriculum in any district. There is money available now and in the future for this important work. We teachers have a responsibility to make sure that these funds are used wisely and that quality progams suited to local needs are provided. Find out what is going on in your district or region. Get involved and help design inservice programs which suit local needs. If you desire help with regional projects, contact the state Office of Public Instruction specialists in mathematics, science, computer science and modern languages. Let's not complain that we can't do things because money isn't available; the problem may be us.

Reprinted from MCTM, Montana Mathematics Newsletter, February 1987.

Montana Students Sweep 1987 Intermountain Science Symposium

The Intermountain Junior Science Symposium held in Salt Lake City each spring has the pleasure of selecting five students from the six-state region to compete at the national symposium in New York. Montana won four of the five winning positions including the top award. The actual ranking of the other four is not clear but Gil Alexander claims that Kathryn Wyard from Helena High placed second. There is no doubt, however, that Simone Taubenberger of Capital High was the top winner and will be presenting her work at the national competition. The other Montana winners were Kristin Lavery from Sentinel High School in Missoula and Ernie Lee Srom, of Sunburst. The other regional winner was from Las Vegas, Nevada.

Abstracts of the four winning papers from Montana will be in the next newsletter that we hope will be out before summer.

Twenty-five papers were read at the Salt Lake symposium, selected from perhaps 100 papers that were submitted to the symposium selection committee. Montana has its own selection process before the Salt Lake symposium, used to decide who will represent Montana. Montana has many more applicants each year than can be accommodated in Salt Lake City. Three years ago our state quota was 15, but with much prodding that allotment has been increased over the years to 25 and, as this year, we often are first in line for cancellations from other states. A few Montana students usually attend at their own expense as extra delegates and often swell our total state delegation to over 30. With teachers counted we sometimes send up to 40 people to Utah.

When I talked to Barbara Murdock, the symposium coordinator in Salt Lake City about the results, she was very excited and proud of what the Montana students had done. Not only had our students taken the lion's share of the awards but they impressed everyone with their talent, enthusiasm and the depth of science being taught in Montana. She went on to say what was more important was the exemplary behavior demonstrated by our entire delegation. She was obviously very pleased with Montana.

I was personally elated and very, very proud of our Montana students and teachers. I think I speak on behalf of all Montana teachers of science when I say Congratulations for a job very well done! Ya Done Good!!

Montana Science Teachers Newsletter is published quarterly by the Montana Science Teachers Association and the State Office of Public Instruction.

Editor is Doris Simonis, School of Education, University of Montana, Missoula, MT 59812. Send her your activity suggestions, comments, articles, and news about science teachers and science education you'd like to share.

Subscription is $8.00 annually. Send your check, made out to MSTA, to Gil Alexander, Treasurer, MSTA, Helena High School, Helena, MT 59601.

National Bison Range Offers Ecology Workshop May 2, 1987

Spring will bring an outdoor education workshop for Montana teachers at the National Bison Range, Moiese, MT, on Saturday, May 2, 1987. There will be three day-long seminars and activities, one of them offered for the first time. Participants can select "Wetland Birds," "Geology of the Flathead Valley," or "Concepts and Methods of Environmental Education."

The Bison Range hosts semi-annual workshops to present ideas for using the outdoors as a classroom; to introduce teachers to persons currently involved in outdoor education programs who are willing to share skills and materials; to demonstrate advantages of natural sites for outdoor education; and to familiarize teachers with resources and materials available for environmental education.

Registration forms and more detailed information are available from Marcy Bishop, National Bison Range, Moiese, MT 59824 (644-2211) or Michael Malouf, Continuing Education, University of Montana, Missoula, MT 59812 (243-2900).

Life Science Teachers, Apply for State Honors!

Nominations are currently being accepted for the 1987 Outstanding Biology Teacher Award for the state of Montana. The award program, conducted by the National Association of Biology Teachers, is intended to identify and reward excellence in biology teaching by selecting an outstanding biology teacher in each of the 50 states. The program is sponsored by Silver Burdett-Ginn Publishers, who present each award winner with a world-class pair of binoculars. In addition, winners also receive framed certificates, as well as public recognition and professional satisfaction. Award recipients will be invited by NABT to a special luncheon to honor awardees, held in conjunction with NABT's National Convention in Cincinnati, Ohio, in October, 1987.

All biology teachers of grades 7-12 in public or private schools, who teach primarily life sciences, are eligible for nomination. Membership in NABT is not required. Candidates may be renominated in subsequent years. Nominations can be made by colleagues, administrators, students, the teachers themselves, or anyone else competent to judge the candidate's teaching effectiveness, ability, experience, inventiveness, and inherent strength in teaching biology.

The deadline for submission of completed application materials is April 15, 1987. Anyone wishing to receive application forms should submit a nominating letter as soon as possible to: Craig Kuchel, State OBTB Director, Florence-Carlton School, 5540 Old Highway 93, Florence, MT 59833.

Under the Big Sky: MSTA Regional News

The **Science Safety Workshop** series is a great opportunity to learn how to protect yourself and your school from liabillty suits. The final OPI/MSU workshop of this academic year will be held at Fergus High School, Lewistown, MT on April 24 and 25, 1987. Topics include teachers' and administrators' legal responsibilities and training to provide for a safe work place for both teachers and students. A pre-course laboratory walk-through assessment must be completed. Forms have been sent to area high school principals. Academic credit is available to participants. For more registration forms and/or information, contact: Gary Freebury, Flathead High School, Kalispell, MT 59901 (755-7619, ext. 50).

A number of science instructors in Region II are in the process of organizing a **regional science fair** to be held at **Northern Montana College in Havre.** Besides the obvious educational benefits, it is hoped that the fair will help in preparing students and their projects from the region for the Montana Science Fair held in Missoula at the University of Montana. The fair has been scheduled for Monday, March 30th and efforts are under way at this time to qualify the fair for possible I.S.E.F. participation. The fair will involve both junior high and high school divisions, David Puyear reports.

In Missoula, secondary science teachers-to-be at the University of Montana have just organized *Future Science Teachers Association* to promote science education, to provide service to local schools and to the University, and to advance their own professional development by participating in seminars, professional meetings, and conferences such as those sponsored by MSTA and MAS. All preservice students in elementary education are now being recruited to join the twenty charter members. Officers are David Cunningham, Kathy Heffernan and Robin Kent. Doris Simonis is the faculty advisor.

Richard Menger of Baker High School will have two publications in the *American Biology Teacher* this year. "Bag of Bones" and "Green Jeans Horticulture" which appeared in recent editions of this newsletter were the nuclei of more extensive articles to appear in forthcoming issues of AST. Remember, you saw them here first! Congratulations, Rich.

The Great Falls School District also deserves congratulations. As coordinator of its environmental education program, *Jan Thomson* and master teachers *Dennis Maxson and John Cannon* are representing their district's award-winning environmental education program at the NSTA national convention in Washington, D.C. this month. Great Falls was identified as one of ten exemplary centers of science education in the nation during NSTA's 1987 "Search for Excellence." Their 20-year history of experience-based environmental program with its diversity of lessons and field trips is recognized as an exciting and supportive complement to traditional school science. A forthcoming Phi Delta Kappa fastback will also recognize the Great Falls program as an excellent model.

-Tom Facey, eighth grade science teacher at Meadow Hill, coordinated the fourth convocation for seventh and eighth grade students in Missoula School Dist. 1 on March 4 and 5. This year's two-day community-based seminars and activities were centered on "Water Quality and Economic Growth." Twenty-four local and regional community leaders shared their expertise and opinions, with a hundred students organized into ten investigative teams. The student groups also toured the Grant Creek area, the local sewage treatment plant, and two toxid waste areas before presenting their own reports synthesizing what they learned and making recommendations for Missoula's future.

Horticulture students at Baker High School are continuing a school tree-planting tradition this spring by setting out 600 saplings. They have already developed a large shelterbelt around the football field and have shaded the municipal golf course by their growing involvement with non-native trees. Evidence of their success under Rich Menger's mentorship are numerous thriving caragana, Siverian elms, green ash, plum and apple trees, blue spruce, and junipers.

BEST Project

The Montana Science Teachers Association is the proud recipient of a National Science Foundation award for the "Better Elementary Science Teaching (BEST) Project."

By the time the details are worked out with the NSF we will be out of time and unable to run the project beginning this summer. The grant is sure, however, so the MSTA has put the wheels in motion to begin this summer and will catch up the details later. The first institute will be held at Eastern Montana College with Dr. Jerry Jinks as the 1987 institute director. Plans are well along and we feel very comfortable that this first "BEST Institute" will be an excellent opportunity for K-6 grade teachers.

Many people in Montana played important roles in the development of this grant proposal. It actually began three years ago when Bob Briggs called a team of science educators to Helena to discuss the possibilities. It was a very discouraging meeting and the members went home without any concrete plans. Thought did not stop however, and ideas continued to flow. A plan began to take shape several months later and a draft proposal was written and presented to the Montana Science Advisory Council. More changes were made and the proposal was submitted to the National Science Foundation. NSF considered it the best of the non-funded projects (is that the same as the worst of the best?) and suggested we make some changes. We did and here we are. Thanks team for a job well done.

I could not remember all the members of that first team but some of those included were: Gerry Wheeler, Ken Bandelier, Everet Pitt, Ken Price, Doris Simonis, Gil Alexander, Jim Cusker, Jerry Jinks, Gary Swant, Bob Makela and Larry Fauque.

Enclosed with this newsletter is an application flyer that describes the project and lists the selection criteria. If you have any questions about the project itself, contact Bob Briggs at OPI. He will be the overall project director. For questions about the institute or application details contact Dr. Jerry Jinks at EMC (his address is on the flyer).

Resources For Teachers

The Junior Engineering Technical Society (JETS) and the National Engineering Council for Guidance (NECG) is offering a special "sampler" package of guidance materials. These guidance brochures cover such topics as:

After High School—What?
Is Engineering for You?
Engineering, Your Key to the 21st Century
A Guide to Financal Aid
Women in Engineering
Engineering Technology Creates New Careers
Work and Preparation of Engineering Team Members

To get your FREE package of brochures, send a self-addressed number 10 or 11 envelope with 44 cents postage to: JETS, 1420 King Street, Suite 405, Alexandria, VA 22314-2715 with "EC-2" written in the lower left-hand corner of the envelope. No letter of request is necessary if the "EC-2" appears on your self-addressed envelope.

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A useful 5½ by 8½ inch **Energy Conversion Chart** which compares Btu values of natural gas, electricity, oil, and coal (and may be reproduced) is available free of charge from Document Center, Institute of Gas Technology, 3424 S. State Street, Chicago, IL 60616. Phone (312) 567-3650.

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Teaching astronomy or aerospace topics? An annotated list of **astronomy software for microcomputers** which has just been published reviews programs ranging from simple calculations to elaborate home planetarium and space travel simulations. To get a copy of the 8-page guide, send a donation of $2.00 with your name and address to: Astronomical Society of the Pacific, 1290 24th Ave., San Francisco, CA 94112.

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Do you have an idea for **teaching scientific literacy through audiovisuals?** Can you claim that it will help science and social studies teachers forge links between science, technology and society? Hawkhill Awards competition has established a $1000 first prize in an annual competition for the best idea on this topic. There will also be five honorable mention prizes of $100 each. The award was established to honor Christa McAuliffe, citizen-astronaut, who claimed a great mission: "I touch the future. I teach." For more information, write: Hawkhill Associates, Inc., P.O. Box 1029, Madison, WI 53701.

‡ ‡

Free booklets and posters on marine science are available from the Marine Science Center, Oregon State University, Marine Science Dr., Newport, OR 97365; phone (503) 867-3011. The center also sponsors summer workshops and distributes a large format, well-illustrated Oregon Ocean Book ($7.25 postpaid).

Sea Grant Abstracts are sent free to qualifying institutions (such as schools). They are good for courses from biology to earth science, ecology, and zoology. Tell your librarian! Write to: Sea Grant Abstracts, P.O. Box 125, Woods Hole, MA 02543.

† †

Scientific Methods for Grades 4-7 are explained in a teaching kit, "Stretching Your Mind," available free. Kit includes guide, wall chart and duplicating masters. Send requests on school stationery to: Education Bureau, Firestone Tire and Rubber Co., 1200 Firestone Parkway, Akron, OH 44317, or phone (216) 379-7000.

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You can get a **colorful wall poster** "Conservation and Full Utilization of Water," free of charge from the Bureau of Reclamation, Attn: Code D-822A, P.O. Box 25007, Denver, CO 80225. They also have four Water Recreation Area Maps (of the western states) available free of charge. Call (303) 236-6741 for more information.

Attention MSTA Members

After a written request to the Executive Committee, the Science Olympiad Team recently received a donation from the Montana Science Teachers Association.

A most sincere *Thank You* to each and every one of you for this contribution to our funding. We expect to attend the Science Olympiad Nationals at Ohio State University in May after winning the state competition last November.

The team consists of 15 Helena High School students from grades 9 through 12, who will enter competition which covers 23 different events in science.

Your support is very gratifying and we will do our best to represent Helena School Dist. 1 and Montana as well as possible.

Sincerely,

Jane Dibert
Mike Smith
Joe Veneziano

Don't Forget
the Montana Academy
of Science Meeting
April 3-4, 1987
at Eastern Montana College
in Billings

Workshop for Chemistry Teachers
Washington State University Campus
July 5-31, 1987

A regional workshop for high school teachers of chemistry in the Northwest is planned. We propose to bring 50 experienced teachers from Idaho, Montana, Oregon, and Washington for a one-month intensive workshop in the summer and two follow-up sessions during the subsequent academic year. The focus of the program is safe lecture demonstrations and the use of computers in effective instruction. The intent is to assemble a group of teachers who will be motivated, prepared and supported to catalyze the improvement of the teaching of high school chemistry in the Northwest.

We are optimistic that this workshop will be funded by the National Science Foundation, and, in order to meet the necessary schedule, we are proceeding with our plans. As soon as we have a definite NSF decision, we will inform all applicants.

Deadline for receipt of applications: Shortly after April 15, 1987
Proposed date to notify participants: May 20
Firm dates for workshop: July 5-July 31
Firm dates for follow-up sessions: November 5-8, 1987; March 31-April 2, 1988

Financial Support: Transportation: Round trip mileage between home city and Pullman. Subsistence: WSU dormitory and board rate (can be applied toward off-campus living). Stipend: $200/week; one-half in July, remainder upon completion of follow-up sessions. Academic Credit: 4 semester hours upon completion of entire project including submission and distribution of assigned materials at the end of the two follow-up sessions.

Lectures: Will focus on standard chemical topics (structure, thermodynamics, kinetics, the Periodic Table, reactivity, etc.) that are taught in the high school curriculum. Emphasis will be on the use of demonstrations to exemplify topics and enliven lectures.

Guest Lectures: Discussion of issues such as Effective Instruction and Safety in the Laboratory, the Relevance of Science Education to Modern Technology, and Societal Issues.

Laboratory: Expansion of participants' repertoires of demonstrations keyed to chemical topics. Integration of experiments into curricula. Modification of demonstrations to local situations.

Computers: Courses as needed. Instruction on availability of programs and demonstration of use of computer materials for instruction and classroom management. Interfacing computers in the laboratory. Distribution of SERAPHIM materials.

Daily Schedule: Will be modified as needed. There will be evening programs. It is anticipated that scheduled programs will go through noon on the first and third Saturdays and end at noon of the second and fourth Fridays.

Staff: *Principal Lecturer:* Professor Glenn A. Crosby, Washington State University; *Computer Instruction:* Professor Ronald D. Poshusta, Wasington State University; *Laboratory Supervisor:* Mr. George Johnson, Pullman High School; *Appropriate Guest Lecturers:* A firm list of guest lecturers is not yet available.

More Summer Opportunities For Travel and Learning

Montana teachers of science and/or mathematics are eligible for the **NEWMAST** program held at Ames Research Center, Moffett Field, CA, from July 5-17, 1987. Travel, per diem and housing will be provided to select teachers attending NASA seminars on state-of-the-art technology, sessions on curriculum development, field trips (on foot), and other activities related to aeronautics, astronomy, and space science.

Participants will receive NASA resources, the most up-to-date teaching materials and information concerning space and technology as well as get first-hand information on aerospace research from NASA scientists and engineers. This "opportunity of a lifetime" requires you to complete an application form available from Doris Simonis, 243-5204 or 243-4911 or Bob Briggs, 444-4439 or write to NEWMAST, NSTA, 1742 Connecticut Ave. NW, Washington, D.C. 20009.

NSTA Computer Camp for Teachers will be held July 5-17, July 19-31 and August 9-21 at the Pocono Environmental Education Center (PEEC) in Dingmans Ferry, Pennsylvania. Participants will spend two weeks improving their computer skills while communing with nature. Limited enrollment. Send applications to NSTA Computer Camps, National Science Teachers Association, 1742 Connecticut Ave. NW, Washington, D.C. 20009, Attn: Marily DeWall.

The **American Geological Institute Internship** program for outstanding secondary science teachers is accepting applications for the 1987 Summer (July-Aug.) and Fall (Sept.-Dec.) terms. Two interns per term will be selected to work with the NSF Division of Ocean Sciences in the Washington, D.C. area. Funding will be provided for salary, relocation and travel. For more information contact: Andrew Verdon, Jr., Director of Education, National Center for Earth Science Education, American Geological Institute, 4220 King Street, Alexandria, VA 22302.

Field Geology for Teachers, a three-credit course for elementary and secondary school teachers will be conducted twice, July 5-18, 1987 and July 19-August 1, 1987, near the Tetons and Yellowstone National Park. Emphasis will be on description, identification and interpretation of geologic features in the field. After completing this course, teachers should be competent to interpret the general geology of their home areas. Headquarters will be the Timberline Ranch in Wyoming. Registration for credit, laboratory fees, room and board cost $411.50. Van service from the Jackson, Wyoming airport is $15. Each participant will receive $124.50 for travel expenses. For further information, write to: Robert G. Williams, Field Geology for Teachers, Department of Geology, Miami University, Oxford, OH 45046.

A variety of summer **Field Courses in Glacier Park** are available for academic credit, some from Flathead Valley Community College and some from the University of Montana. Courses run 2-5 days and cost $80-$205. Lodging and cooking facilities are available for $2/night at the Glacier Institute Camp near West Glacier. Topics include Teaching in the Outdoors, Color Photography, Roadside Geology and others. For further information, write: Ursula Mattson, The Glacier Institute, P.O. Box 1457, Kalispell, MT 59901.

A **national workshop on teaching astronomy** in grades 3-12 will be offered July 11 and 12, during the 99th Annual Meeting of the Astronomical Society of the Pacific at Pomona College in Southern California.

The program will include hands-on sessions about specific classroom activities and resources, nontechnical lectures by noted astronomers, guidance for selecting and using basic telescopes and computer software, and an evening star party. The workshop is designed for people without extensive background in science. Credit will be granted through the Claremont Graduate School and inexpensive dormitory accommodations will be available.

The workshop is open to all teachers, librarians, curriculum specialists and others working with young people. To get more information and a registration packet, write to: Summer Workshop, A.S.P., 1290 24th Avenue, San Francisco, CA 94122.

Fifty-eight **field classes for educators** in Yellowstone Park are another option for vacation fun or for academic credit. Courses on mammal tracking, birds, geology, history and astronomy vary from one to five days in length. For details on fees, credits, and a free course catalog, write The Yellowstone Association, P.O. Box 117, Yellowstone National Park, WY 82190 or phone Gene Ball, (307) 344-7381 ext. 2384.

Challenger Scholarship Flight Open for 1988 High School Graduates

High school juniors in western states, including Montana, are invited to compete for a Wescon "Challenger" scholarship of $5,000. Established in honor of the seven astronauts who gave their lives to further this nation's exploration of space, the scholarship will be presented at the Wescon/87 Electronics and Trade Show being held in San Francisco November 17-19, 1987. The winner and a chaperone will be provided flight tickets and one night's accommodations to attend the ceremony.

The winning application will be based on a 500-word essay expressing why the student wants to pursue a career in a scientific technology-related field, and how the pursuit of such a career will benefit the United States. Financial need is not a consideration, and grade point average will be considered only in case of a tie. Essays must be received no later than 5:00 p.m. July 10, 1987. Entry forms can be obtained from: Le Schinneller, Wescon/87, 8110 Airport Blvd., Los Angeles, CA 90045-3194.

New Metric Unit

The Jinks: The basic measure of hot air. One jinks is the amount of hot air generated in a typical college science classroom in 50 minutes. It's origin is unknown. (It is estimated that a one-kilojinks hurricane would remove about six inches of topsoil from all of eastern Montana.

From ICTM, December 1986 Newsletter.

Astronomy

A free newsletter for teachers of astronomy (all levels) is available by writing on school stationery to: Teachers Newsletter Dept., A.S.P., 1290 24th Ave., San Francisco, CA 94122.

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Jack Straw Learns A Secret
A Study of Mealworms (sort of)

by Douglas Ruhman
Elementary Education Major
University of Montana
Missoula, MT

Jack Straw was a worm. No, not a **real** worm like you might see squiggling around in a pile of dirt; he was sort of like a caterpillar, but not a **real** caterpillar like you might see on a leaf with all those hairs and funny spots and stuff. Jack was a special animal called a 'larva,' but if you called him that he'd probably wonder what you were talking about. Fact is, Jack, being a young larva, had never seen anything other than a few other larvae (that's what you call more than one larva) in his neighborhood, which was quite dark and was made up of oatmeal. Now can you imagine living in dry oatmeal? Well, some animals do, and Jack was one of them. He quite liked it too, and couldn't even imagine a nicer place to live. He ate the oatmeal, and there was sure lot of it around, so there wasn't much to worry about. In fact, he didn't think of much of anything other than eating oatmeal and sleeping and eating more oatmeal and sleeping some more and eating even more oatmeal and so on.

All this went on quite merrily and without interruption until one day, without any warning at all...some of the oatmeal...moved! All by itself! Jack, of course, wasn't used to such things, and well, he ran away (larvae aren't the hero type, you know). But every time he looked back behind him, the oatmeal was moving. "What could **that** be?", he asked himself. Finally, Jack went "pumpfl", smack into a hard, gray wall. He had reached the end of the oatmeal! This quite surprised him, as he never suspected there was an end. Well, he could think about that later. Right now, there was this moving oatmeal to deal with. He turned around just in time to see (and you can just imagine how surprised he must have been) a big black shiny thing coming out of the oatmeal. It was a bit shorter than he, but much fatter, and very different.

As soon as it saw Jack, it jumped back on its rear legs and "Yikes!" it shouted. Then it wheeled about in terror, and disappeared through the oatmeal. Jack was so scared, he yelled "Yikes!" too, and closed his eyes tight. I suppose if he had hands, he'd have held them over his eyes in fright. But, being wormish, there was nothing he could do. When he opened his eyes again, he saw the oatmeal move again after a moment, and the black thing poked its head in once more, its many eyes wide with excitement.

"I'm dreadfully sorry; you startled me. I haven't seen anyone like you in quite some time," said the huge black thing. "You see, I'm getting close to the end, and I was looking for...say—what's your name, anyhow?"

"J-Jack. Jack Straw. What's y-yours?"

"Black Peter's my name, thank you. Hmm, you'll make a swell one, you will."

"Excuse me?", said Jack.

"I said you'll make...Do you know what I am, boy?" He cocked his head to the side and waited for Jack's answer.

It seemed to Jack that this thing was very interested in him, and he was feeling less and less afraid of it. In fact, it occurred to him that the great black thing was quite magnificent, actually. Yes, beautiful might be the word! There was something really wonderful about Black Peter that Jack felt but couldn't quite say. Then he remembered his manners.

"Oh, uh...sorry. No, I don't have any idea what you are, though it seems that perhaps I should."

"Well," said Black Peter, "Do you know what you are?"

Now Jack had never thought about that before. 'N-No. I guess I don't."

"Ah, that's what I thought," chuckled Peter. "Perhaps you and I should have a talk." And with that, big Black Peter pulled up a wad of oatmeal, sat down on it and began to speak to Jack of all manner of interesting things. This is roughly what he said:

"Now Jack, you are what people call a Mealworm."

"People? What are people?" interrupted Jack.

"Shh...I'll get to that later."

"But these "people" must be pretty important—why do they call me a mealworm?"

"Well, because they make up words. They like to do that."

"Why?"

"Because they can talk."

"And we can't?"

"Not exactly..."

"Then how come we are?"

"Because we're in this story and it's being told by one human to other ones. You can do anything in a story."

"Oh, I see."

"Now, where was I?"

"Mealworms."

"Oh, right. You, my friend, are a mealworm. Mealworms are beautiful creatures. The most subtle and gorgeous shade of gold. Like bamboo when it's dry. You were born from a single egg laid by your mother about a month ago. You started out very small, but looking much as you do now. Have you ever really looked at yourself closely? You know, mealworms are quite beautiful."

Jack bent himself over a little to get a good look at his body. He wiggled his six little stubby legs. "Hmm...I never really noticed—and it's kind of hard to see the rest of me."

"Well, you should," said Peter. "You have 12 segments and a head, 3 pairs of legs, 2 kind of interesting little prongs on your last segment, and 2 specialized feet underneath it that help you move. Where your segments come together your color is darker, almost brown. Where the rest of you is a beautiful yellow. *Tenebrio Molitor!*"

"Gezundheidt," said Jack.

"No, no—that's your name!"

"I thought my name was Jack Straw the Mealworm?"

"Well, uh, never mind. You were born here in this container about eight months ago, as I said, and you feed on oatmeal."

"Isn't it just heavenly?", said Jack, nibbling a piece off a chip of oatmeal next to him. "Have some!"

"No thanks, I don't eat."

"At all?"

"No. But let me continue. You are, I'd say, about 2.6 centimeters long and weigh less than a gram!"

"Gram?" As in Graham Crackers? I've heard of those! They sound delicious."

"No! No! Gram is a measure of weight. You are here, right? Real right? Well, everything that is real has some weight. Your weight is just less than a gram. You move quickly by scrunching your body into the air, and then holding fast to something with those little hind feet of yours, the only place to go is forward. Your six legs help you guide and direct your motion. You will continue to eat and grow until, a few weeks from now, it will happen."

"What?" Tell me what will happen!"

"You will see. All I can say is that someday you will be very different."

"Well, that's crazy! I'll be different? Very different?"

"Yes," said Black Peter, "but not to worry. It's as it should be."

"But, what are you?" said Jack.

"I am also a beautiful thing! I am a beetle."

"A whatle?"

"A beetle. The handsomest beetle of all, I think. And there are over 250,000 kinds of beetles. Some are very similar, like my cousin *Tenebrio Obscura*. He is a dull black, not a bright, shiny black like me! I have three body parts—a head, a thorax, and an abdomen. Would you like to know more about me?" asked Peter.

"Oh, yes! Please!"

"You're sure you're not bored!"

"No. Oh no. It's somehow very interesting to me."

"Well," Peter continued, "my head houses my brain, my mouthparts, my eyes and my antennae. My mouth has mandibles for cutting and palpae for grasping food, and yet strangely, I don't eat. I have not two eyes, but two sets of many eyes. They help me to see one big picture by putting together many small ones. My antennae are sense organs; they help me feel and smell things and are very important in a lot of ways. This thorax is my middle part. It keeps my legs together and is responsible for all my movement.

"My abdomen has the holes called spiracles with which I breathe, and the organs I need to mate. All living things that have six legs are called insects. Some living things have only one leg (like a flower), or two legs (like people), and some have four legs (like elephants)..."

"Elephants?" said Jack.

"Elephants. Never mind about them. Beetles are the subject here. Beetles, being insects, have six legs and wings. Oh, had I mentioned the wings?"

Jack looked in amazement as Peter's black, rounded back split in two and separated, lifted into the air. Two delicate wings spread out under them.

"Wow!" said Jack. "Can you show me how you use those?"

"Well, it's kind of hard in all this oatmeal, but you know, I'd like very much to try them out. I don't know if I ever will, though."

"What? That's crazy! If I had wings, I'd be trying them out all the time! Say, where could you try them out?"

"Well, we'd have to leave the oatmeal for a while."

"Let's try! I'd like to see what's on the outside anyway, and then you could try your wings out and we could come back to the oatmeal. How about it?"

"I don't know, Jack. The people might see us."

"Well, we aren't going to hurt them, right? So they won't hurt us."

"Well, there's something I didn't tell you."

"What's that?"

"We're eating their food."

"Oh. Uh, *gulp* well, let's try anyway."

"Okay, I guess it's worth a try!"

So, Jack and Peter squirmed upward and upward until finally they reached the top of the oatmeal. After struggling for a while, Peter was able to move the lid just enough to squeeze out with Jack close behind. Suddenly, they fell down and down...plop! With sore heads they got up, looked around, and decided to scurry over into a dark corner behind the Fruit Loops.

"Gosh, these containers are huge!" said Jack. His eyes hurt him, since there was a little more light outside the oatmeal than inside. Just then a loud crack broke the silence. Light streamed inside and blinded both Peter and Jack and a monstrous voice thundered, "What'll it be today, boys? Oatmeal? Okay, we haven't touched that in a long time."

Then a huge horrible ugly hideous thing that Jack guessed must be a "people" reached in, took away the container, and then put it back again. It slammed the door closed and once again it was dark. Jack just looked kind of sickly at Black Peter, who just said, "I told you they were dangerous."

At this point, Jack stepped back, and Peter started running up and down the wooden runway, trying to leap off the ground and be airborne. He wasn't doing a great job, however. "Must need more practice," said Peter.

All of a sudden, Jack felt funny. "Black Peter, I have to go right now. I feel strange. I need to go back into the oatmeal." A great climber he wasn't, though, and try as he would, he just couldn't get up the side of the round container. The funny looking man in the blue hat that was painted on the label kept smiling at him as though he were laughing.

"Over here," cried Peter. "Here's some flour with a hole in the bag. We can hide in here."

It was just in time. Jack started to curl up and say nothing. Peter knew what was going on, so he said goodbye and went off looking for whatever it was he was looking for earlier in the oatmeal. He left Jack alone. For a few days, Jack just lay quietly and ate or said nothing. Something was happening to him. He was changing. But he wasn't scared; it seemed kind of normal, even though everything felt so weird. At one point, he went to sleep—a very deep sleep which lasted many days.

When Jack awoke 10 days later, he felt even stranger. Next to him was a thing that looked a lot like him, but hideously ripped apart. He jumped up in terror upon seeing it and tried to run. And run he did! For now he had LEGS. Six big legs, each one as long as two of his old body segments. He looked down at himself. He looked exactly like Black Peter! It all started to make sense now. He was a beetle, just like Peter, all the time! When beetles are young, though, they're caterpillar-ish! Then, he guessed, he must have left his old skin (the segments) and become a pre-beetle of some kind, before finally becoming the pale, brown beetle with wings that he was now. In a few days, the dark black shiny coat that Peter had would belong to Jack. He got up and started looking immediately for another beetle. Why? Because it takes two beetles to make another one, just as it takes two grasshoppers or two cats or two people or two elephants. And this is what Jack knew he had to do. This must have been what Peter had been looking for. Jack suddenly felt very wise and full of energy and purpose.

A few days passed by and the new flour neighborhood seemed without any other meal-beetles, when suddenly...some flour moved...all by itself! Jack's antennae were signaling something very interesting just ahead. He scurried up to see what it was, and when he poked his head through the flour, he saw a young, yellow and brown-striped mealworm staring at him.

"Yikes!" said the worm.

"Hello. Do you know what I am?" said Jack.

"No, but it seems like I should," said the worm.

"I'm Black Jack. Perhaps we should have a little talk..."

And the beetle began to tell the little larva a story.

Does Montana Treat Female Mathematics and Science Students Poorly??

Dan Dolan
Office of Public Instruction

A summary of the 1986 PEER report card, a state-by-state summary of the status of women and girls in American schools, was reported in the October 1 issue of **Education Week.** One particular sentence in that report aroused some hostile feelings and my curiosity as to its accuracy. The survey, by the "Project on Equal Educational Rights" (PEER) stated that "The District of Columbia, Mississippi and New Mexico rated highest in preparing young women for college, while Montana, Maine, Idaho and Utah produced the poorest results." For Montana to be put at the bottom of the barrel hurt. I began my own study to check the validity of this statement.

The conclusions in the survey were based on SAT scores, college enrollment figures, and the types of college degrees awarded to women. Feeling sure that a careful study of data would put Montana in a better light, I began to research the Montana ACT and SAT test results of the last few years. To my dismay, I found that the PEER conclusions may have some basis in fact. More careful study of the mathematics and science scores led me to believe that we mathematics and science teachers must seriously analyze our treatment of female students.

Consider the following information: In 1986, males outscored females by 61 points in the mathematics section of the SAT test (578 male to 515 female). Montana ranked 47th in the U.S. for the differential between female and male test scores in mathematics and 46th for the differential in verbal scores.

When students reported their rank in the graduating class, 42 percent of Montana's female students and 34 percent of the male students taking the SAT were in the top 10 percent of their graduating class. However, the males in this group outscored the females by 80 points on the mathematics test, 649 to 569. In the top 20 percent of the graduating class, 65 percent were female, 59 percent were male, yet the males again scored 44 points higher in the mathematics test, 579 to 535. Seventy-five percent of the male students scored above 500 on the SAT math test, whereas only 56 percent of the females scored above 500.

Why do female students rank so much higher according to GPA, a rank determined by teacher grades, yet are outscored on the math test by such a significant margin? These tests are developed to measure achievement and mastery of subject material. One would think that high achievement as measured by grades and class rank should be directly proportional to test achievement—not inversely proportional.

Analysis of the ACT tests indicated similar results. Students self-reported GPAs for math were 2.70 for female, 2.68 male. In science, females also reported a higher GPA, 2.90 to 2.86. Test scores, however, were again inversely proportional to GPA results. In mathematics, the mean male score was 19.8 versus 17.4 for females. Science scores show even greater disparity; 23.9 male to 21.9 female. While the numbers appear close enough to say there is little or no difference, when these scores are correlated to an SAT scale, then the male to female differential in test results is 53 points in both mathematics and science.

A review of the students scoring at the upper levels reveals large differences also. Twenty-five percent of the males versus 16 percent of the females scored in the 26-36 interval in mathematics. In science, the difference was 43 percent to 27 percent. Looking at all students that scored 21 or above on the ACT test, males again surpassed females 52 percent to 41 percent in mathematics and 71 percent to 58 percent in science.

As a community of mathematics and science teachers, we need to ask ourselves some hard and serious questions. Are we grading male and female students equitably? Do we grade on the basis of real achievement in mathematics and science? Is our criteria for grading females related more to factors other than achievement and knowledge of the subject matter? Are we more concerned about neat work, getting it done on time, and quiet acceptance of authority than on real knowledge of the subject? How do we as teachers relate to female and male students in class? Who is called upon more often to answer questions? Who is acknowledged with or without being called upon, and how? What is our response pattern to incorrect answers given by students? Research indicates that we tend to encourage males to do better, but help females through errors—"doing the work for them." What is the male to female ratio in our upper-level mathematics and science classes? Are female students encouraged to continue in upper-level classes or are they told "you won't need this later on"?

These are difficult questions, but they demand our concern and attention for answer. Like it or not, Montana has been labeled as one of the four worst states in the country in preparing young women for college. A review of the data above appears to give some credence to poor reting.

I hope that the statement might raise your hackles as well. If it does, fine. But don't get mad and say "He doesn't know what he's talking about," and then not do anything about it. Looking at these state data, I am concerned. Why do we grade females so much higher than males, only to have males indicate far superior achievement in mathematics and science on these tests? Something is wrong. Is this true in your school? Do what I did. Study the class ranking, CPA, ACT and/or SAT test data from your school. Compare female and male results. There must be some schools in this state that have data above and below the mean scores that I have described. Such is the nature of statistics. If your school data shows similar or worse results, get your mathematics and/or science staff together and ask "why?" Then do something about it.

The data is clear. The conclusions are disturbing. Females receive higher grades than males in math and science. Males score much higher on SAT and ACT tests in math and science, thus indicating higher achievement. Grades should be directly proportional to achievement. They aren't!! We have a responsibility to correct this situation. Montana is proud of being in the top six in the nation in its SAT and ACT test results. There is no reason for us being in the bottom four in preparing young women for college.

Montana's Centennial Scholar

Governor Ted Schwinden announced the selection of **Robert Rudloff-Summers** as **Montana's Centennial Scholar** in a program sponsored by the National Institutes of Health.

Rudloff-Summers, a junior at Sentinel High School in Missoula, received an expense-paid trip to Washington, D.C. in February, where he joined scholars from other states at a three-day seminar highlighting career opportunities in bio-medical research.

"I was impressed by the academic achievements in science and math of all the applicants for this program," Governor Schwinden said. "Mr. Rudloff-Summers and the other students have clearly been afforded top-notch opportunities for scientific study by Montana schools."

The Centennial Scholar Program, intended by N.I.H. to stimulate student interest in bio-medical research, also rewards teachers who have inspired students. Rudloff-Summers was invited to bring one of his teachers, Mr. James Cusker of Sentinel High School, to attend the seminar with him.

Christina Hull, a junior at Capital High School in Helena, was named first alternate in the event Rudloff-Summers was unable to attend.

Sabbatical Leave Opportunity for Science Teachers

Assisted by grants from the 3M Foundation and Cray Research, Inc., Gustavus Adolphus College invites applications from high school teachers of mathematics and science for one-year (1987-88) appointments as guest instructors in the departments of **biology, chemistry, geology, mathematics/computer science,** and **physics.** Stipend and relocation allowance awarded.

For further information, contact: Myron Anderson, Project Director, Department of Biology, Gustavus Adolphus College, St. Peter, MN 56082 or phone (507) 931-7328 or 931-7333.

In New York City there are approximately 10,000 Japanese salesmen, all of whom speak English. In all of Japan, 1500 American salesmen—few of whom speak Japanese. Who sells more merchandise?

Plan to Attend The NSTA Regional Convention

The National Science Teachers Association regional convention is slated for September 24-26, 1987, in Salt Lake City, Utah.

An outstanding program of tours, lectures, workshops and demonstrations is planned to be of interest to teachers, administrators, supervisors and the general public.

Plan now to save school district funds by taking advantage of the multiple registration discount for school districts or other sponsors. Two to five teachers receive a 10 percent discount; 6-10 teachers, a 20 percent discount; 10 teachers or more a 30 percent discount.

For advance registration information write to: NSTA Salt Lake City Convention, 1742 Conn. Ave. NW, Washington, DC 20009. For additional information contact Dr. Walter Saunders. Dept. of Sec. Ed., Utah State University, Logan, UT 84322-2815.

Teaching With Chem Cards

The purpose of this game is to provide an enjoyable way to learn how elements combine into compounds. In "Chem Fish" each player is dealt cards from a deck of chemical symbols and must form compounds with cards from his own hand, from the deck, or from the other players. "Periodic Poker" also gives students practice calculating formula weights of compounds. The game includes a card deck of 36 of the most common elements and complex ions, rules for "Chem Fish" and "Periodic Poker," score sheets, and a table of oxidation numbers. Approximate playing time per game is from 30 minutes to an hour for 2 to 6 players. For more information contact: C.J. Bixler, Math Science Department, Durham Technical Institute, Durham, NC 27703.

Heir and their Generic Genes

How many genes are there? On earth, that is. Given the estimate of some 20 or 30 million different species of living things you might be tempted to shrug and say, "Who knows—billions!" You'd be wrong—by quite a few powers of ten. James D. Watson, who won the Nobel Prize for discovering the structure of DNA, defines a gene as "a discrete unit of DNA that produces a given protein." How many different kinds of genes are there? The surprising answer Watson gives—"It might be 100,000." You can read a revealing interview of Watson in BioScience, Dec. 1986, p. 728-31.

Montana Science Teachers Association

Application Form

Name _____

City _____

County _____

Business Address _____

_____

_____

Home Address _____

_____

Grade Level	Grades Taught	Subject Area
☐ Elementary	_____	_____
☐ High School	_____	_____
☐ College	_____	_____

MSTA will help the individual participate in determining the destiny of science education in Montana. The organization serves as a vehicle for educators from all professions to exert positive influences on young people. Many important decisions concerning the scope and direction of science education will be strongly influenced by our organization.

The MSTA goals are to increase public awareness, interest and support of science education in Montana.

Membership Dues are $8.
Make checks payable to:

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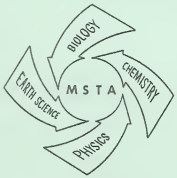
Montana Science Teachers Association



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